

## **Looking Ahead**

### **Patient Safety Week**

Planning for this year's Patient Safety week (3-9 November) is underway, with various opportunities for all staff. The focus this year will be on *Cultural Safety and understanding implicit bias in healthcare*.

### **Health Focus**

#### **Deep Dive - Impact of Body Size on Service Delivery**

CM Health has the largest number of those morbidly obese (body mass index  $\geq 40$ ) of all District Health Boards in New Zealand at estimated 36,000 adults. This is about 8,000 higher than expected for our population age, socioeconomic deprivation, and ethnicity. This number is nearly twice as many such people as the next highest District Health Board. Some of the downstream consequences of our population body size are that service delivery takes longer, is more complex, and is prone of complications. For this report, I have asked Dr Stuart Barnard, Clinical Director of Radiology, to comment on the impact of obesity in Imaging.

#### **The effects of obesity on radiology services at CMDHB**

CMDHB provides radiological services across three sites: Middlemore, Manukau Health Park and Mangere. Radiology procedures include plain x-rays, ultrasound, CT, MRI and image-guided interventional radiology. CT is widely used to image all parts of the body in a wide range of settings from trauma to planned follow up outpatient procedures. It is also used to guide procedures such as biopsies to obtain tissue for diagnosing cancers or infection and inserting tubes for minimally invasive drainage of pus from abscesses. MRI uses very strong superconducting magnets and radiowaves to image the body from head to toe without using potentially harmful x-rays. It is an excellent technique for diagnosing many conditions, including strokes, infection and cancer.

The CMDHB radiology service performed 230,000 procedures over FY 1819, with continuing growth particularly in CT and MRI. Obesity impacts all aspects of the service.

#### **Increase in Demand for Radiology**

Increased patient weight leads to increased mechanical load on the musculoskeletal system, causing an increase in osteoarthritis and soft tissue injuries to tendons and ligaments.

Radiology plays an important role in the diagnosis of and treatment of cancer. It is also used increasingly to monitor the response to expensive treatments and to check for recurrence after successful treatment. Obesity increases the risk of many types of cancer, particularly of the endometrium, oesophagus, stomach, liver and kidney.

The respiratory system is affected by problems with ventilation such as obstructive sleep apnoea and pulmonary hypertension.

Metabolic syndrome with obesity, diabetes and hypertension is associated with an increased risk of heart disease, kidney disease and strokes which all require assessment with radiology. Fatty infiltration of the liver is very common in South Auckland, and causes abnormally raised liver enzymes on blood tests. It also increases the risk of cirrhosis of the liver and liver cancer.

Bariatric surgery is a successful means of treating obesity but a significant number of patients will suffer complications from the surgery and will require radiological diagnosis and treatment of these.

Obesity also causes difficulty with venous access. Radiology nurses are frequently asked to use ultrasound to obtain venous access when ward staff have been unable to insert a venous cannula as they cannot feel or see the patient's veins. A large proportion of the 800 peripherally-inserted central catheters ("PICC lines") that are placed every year are due to obesity-related difficult venous access and/or treatment of obesity-related conditions such as cellulitis. Interventional radiology also insert central venous catheters into the neck veins for renal and other services. This is very challenging in obese patients. We are

occasionally asked to do lumbar punctures (“spinal taps”) in patients who are so obese that the medical and anaesthetic teams do not have needles long enough to reach the spine.

### **Increased risk of workplace injuries**

Most radiology procedures require the transfer of patients from their beds to examination tables and the obese patients require up to six staff for each transfer and expose those staff to risk of injury during manual handling. Interventional radiology procedures often require the retraction of large aprons (pendulous abdomens) to access the groins or compression of vessels after puncturing vessels. This leads to musculoskeletal injury among interventional radiologists and increased consumable costs from retraction devices (for example a self-adhesive plastic film for pannus retraction costs \$100 per procedure).

Ultrasonographers are at risk of wrist and shoulder injuries and this is increased when scanning obese patients as sound waves are absorbed and scattered by fat. Sonographers will often push hard with their probes in the struggle to get diagnostic images.

### **Radiology equipment**

It is often difficult to accommodate severely obese patients within the radiology department. Although we try to procure suitable equipment, patients may exceed table weight limits. For example, interventional radiology tables have a maximum weight limit of between 180 and 250kg depending on vendor and model. The need for the highest possible weight limit can dictate the choice of unit – for example during procurement for the main interventional radiology unit one vendor’s maximum table limit was 200kg. Decision Support have reported that within a six month period from December 2018 to May 2019 there were 43 inpatients weighing => 200kg – if the lower limit table was selected these patients would be denied the opportunity of interventional procedures should they be required.

Patient girth can also be a limiting factor. Some patients may not exceed the table weight limit but cannot physically fit into the CT or MRI scanners, despite CMDHB specifying “large bore” scanners during procurement. Occasionally, such patients simply cannot be scanned with CT or MRI.

### **Image quality and patient dose**

All radiology examinations rely on the detection of energy, whether that is sound energy in ultrasound, x-rays in plain films, fluoroscopy and CT or radio frequencies in MRI. Fat absorbs and scatters the energy, which means that less reaches the detectors and there is less “signal” above the background “noise”. This has three main deleterious effects:

1. Image quality is reduced and at times may be non-diagnostic.
2. Radiation dose to the patient increases if x-rays are used (in plain films, CT and fluoroscopy).
3. Radiation dose to staff increases if using fluoroscopy, e.g. in angiography.

Image quality is also affected when the patient touches the sides of the scanners in CT and MRI.

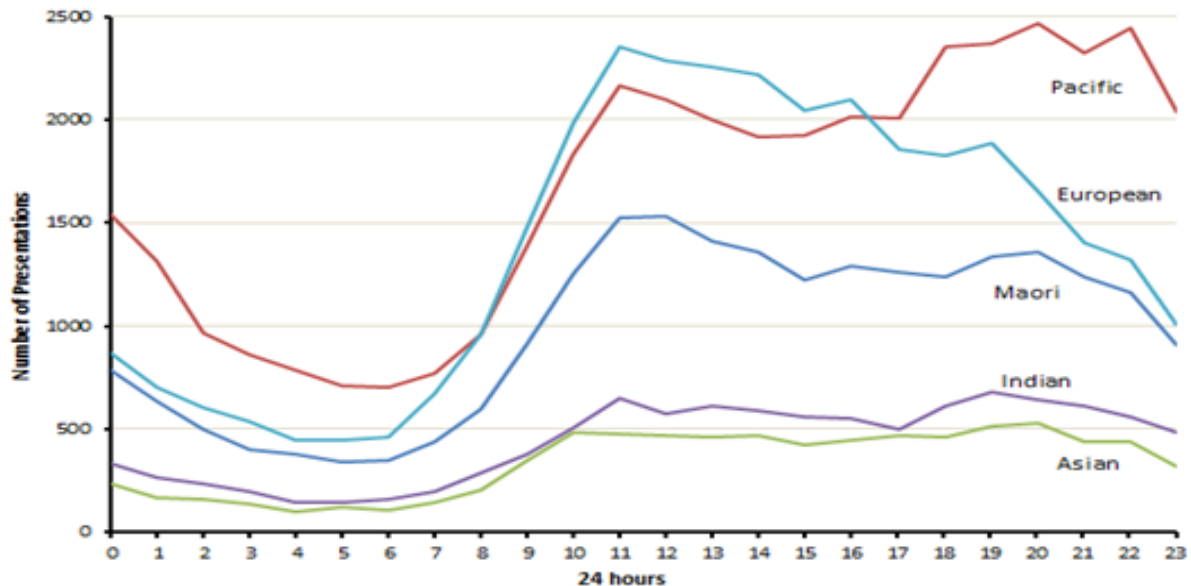
### **Image guided procedures**

Obesity increases demand for image-guided procedures due to a greater predisposition for diseases including cancers, diabetes and renal failure. It also increases the proportion of patients who are deemed unsuitable for surgery or a general anaesthetic and require minimally invasive image-guided procedures such as biopsy or drainage, which may be performed under ultrasound, CT or fluoroscopic guidance.

If the patient is obese it can be very difficult to identify the target and the needle. This leads to longer procedures and a greater risk of complications such as bleeding or damage to adjacent structures.

### **Pacific presentations to the Emergency Department**

Of the 120,000 presentations to CM Health's Emergency Department in 2018, over a third were from Pacific patients. Of interest, Pacific patients presented at different hours of the day than the rest of the population.



Our Fanau Ola team conducted a prospective, observational study of why Pacific patients self-present to the Emergency Department, using the same methodology as a study conducted for the general population in 2009. A structured questionnaire was administered to 340 eligible patients. The majority (n=333, or 97.9%) had a regular GP. The reasons given for self-presenting at the Emergency Department were:

- 60% Referred by GP, Urgent Care Centre, nurse/Ambulance
- 14% GP closed
- 13% Felt their condition was severe to go to their GP
- 13% Other reasons

Further work is required to better understand the needs of this population and self-presentation behaviour. Further work is also needed to understand Primary Care's capacity to see patients.